Advanced PHS

PHS Evolution 2000's

Base on the study report by
Next Generation PHS Study Working Group

Preface

As developing IT (Information Technology) and IP networking, social evolution aimed at the highly informative society towards the 21st century is progressing drastically.

As one of the driving force, the expectation for the personal mobile communications which allows to access to IP network comfortably 'at Anytime, Anywhere' is very strong. PHS is attracting attention as the effective personal means. The further improvement and development is expected to PHS continuously.

1. New PHS Concept and Services

Advanced PHS Concept

The basic concept of the conventional PHS

- A portable cordless phone (from indoor to outdoor)

Offered services:

- High Quality mobile voice communication equal to cable telephone
- Data communications on 32k/64kbps/128kbps

Advanced PHS Concept

- A portable information socket for wireless multi-media communications

Service Needs:

- Improvement in the affinity with IP network connection
- High speed data communications more than 384kbps

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Target

- **Economical offer of mobile multi-media services**
  - **Data Speed : up to 1Mbps**
- **Pursuit of seamless service**
  - **Indoor to outdoors**
  - **Fix/Mobile**
- **Realization of Roaming Service**
  - **Area roaming**
  - **International roaming**
- **System compatibility: Aiming at effective use of the existing one**

PHS Evolution 2000's

Discussion for system compatibility with new PHS and existing PHS

(1) Since some technical parameters will be planned to modify, Advanced PHS needs to be distinguished with the existing PHS.

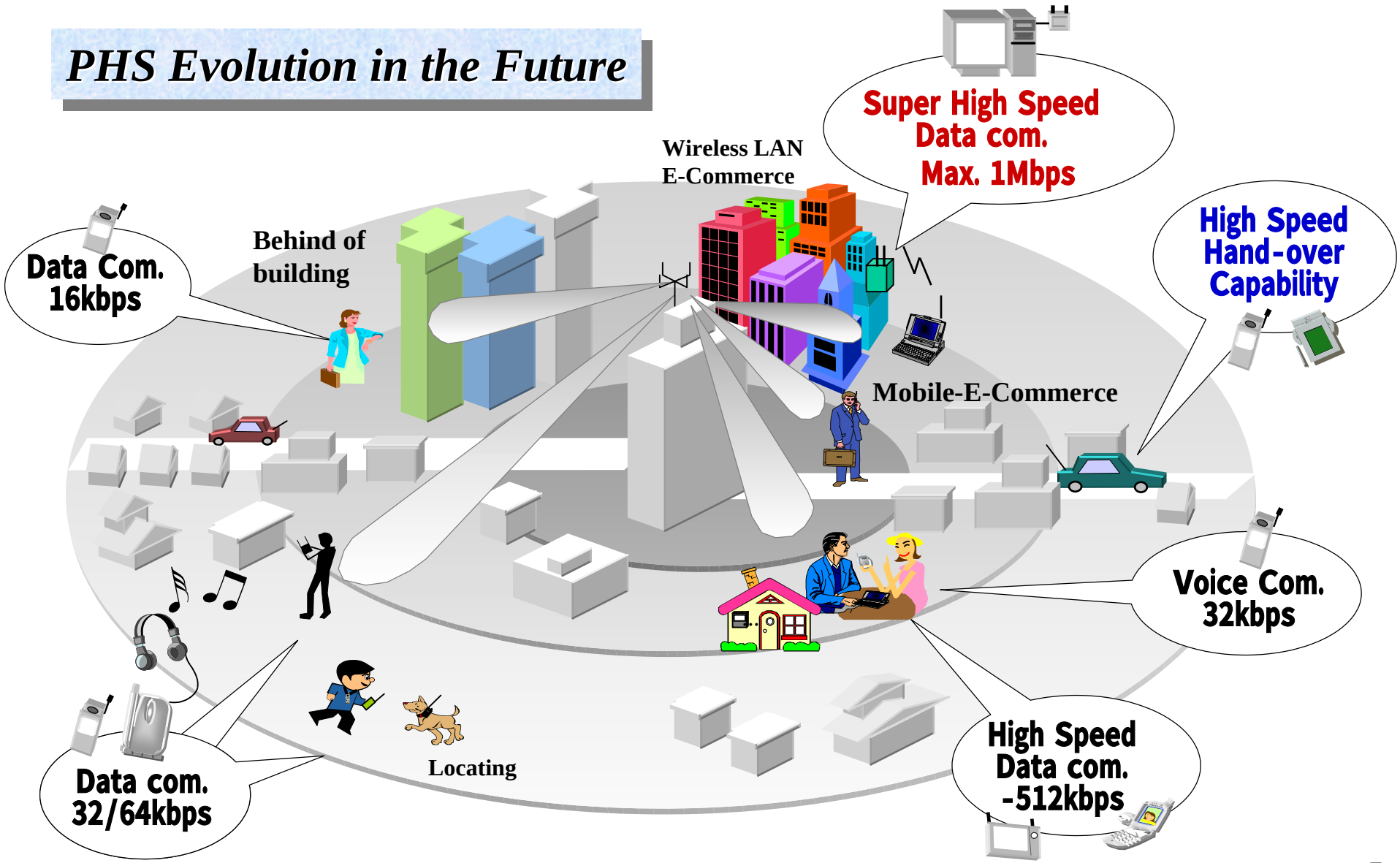
(2) As for the degree of system compatibility, it is dependent on future technical study.

(Remarks)
The technological regulations were standardized and included in RCR STD-28 ver4.0 in March 2002.

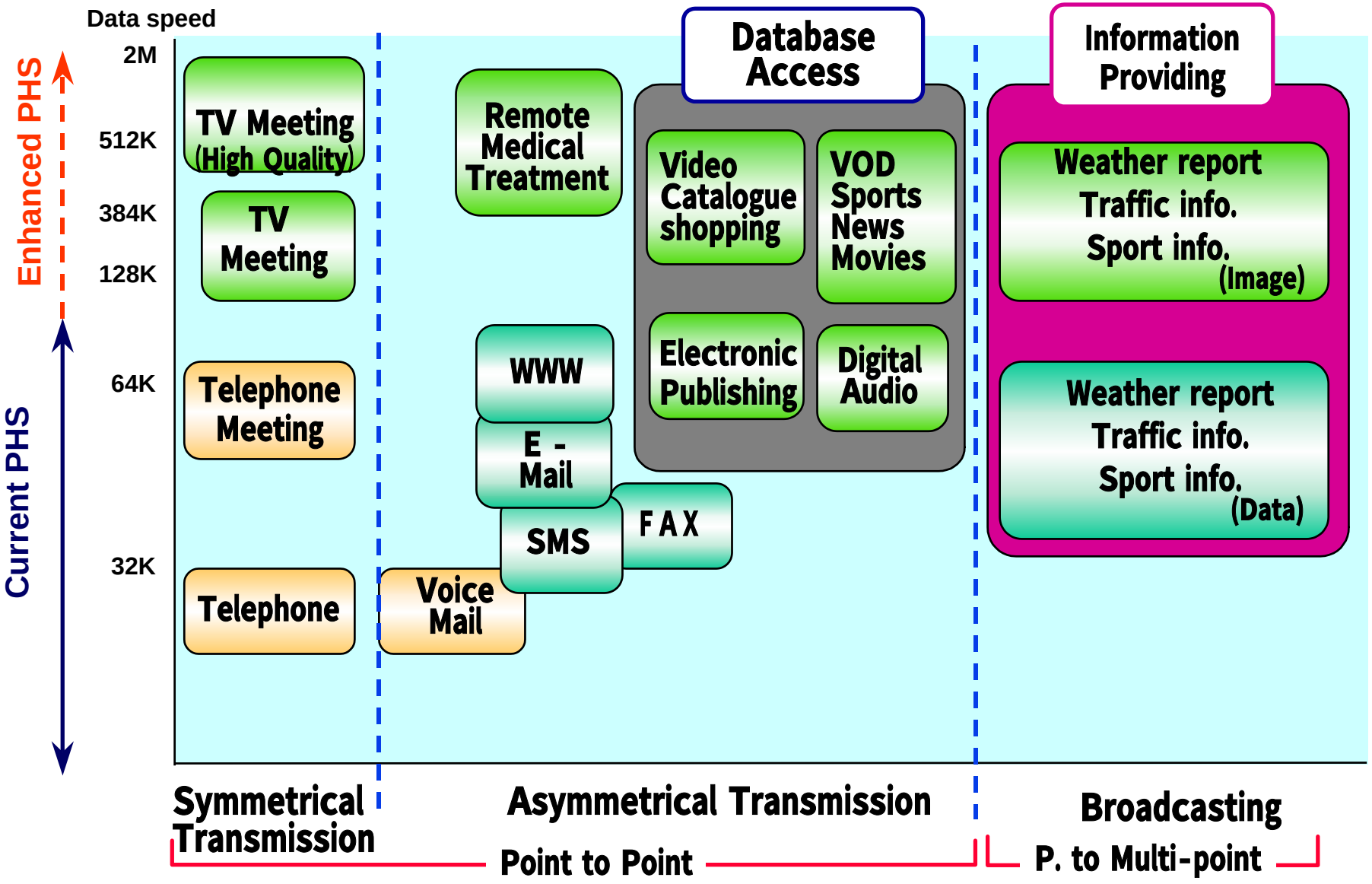
Image of Advanced PHS Multi-Media Services

PHS MoU Group

PHS Evolution in the Future



Expected PHS Multi-Media Services



Developing of PHS Services toward 2000's

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The 1st Generation Voice Oriented → **The 2nd Generation Data Oriented** → **The Next Generation Contents Oriented**

PHS Basic Technology

- Good sound quality
- Small & light weight
- Long battery life
- Walking speed
- Seamless between Public, Home, & Office
- Multiple carrier
- Small cross interference
- Rich functions
  Answering, Voice mail
  Transceiver,
- WLL application
- Home antenna repeater

Data Oriented Service

- Short message service
  -Storage Type
  -Direct comm. Type
  -UUS Type
- PIAFS 32/64k service
- Locating service
- E-mail
- Internet & Intranet
- SOHO
- Office LAN
- Telemetering
- PC, PDA mobile comm.
- Transceiver data comm.

Contents Oriented World

- Agent function
  -Map indication for trip
  -Navigator for mobile
  -Scheduler telling time
  -Wireless secretary
- Guide for handicapped
- Messages & pictures obtainable at any time & place with intelligence

Necessary Technology for the next generation hardware & software

PHS Evolution 2000's Terminal Images

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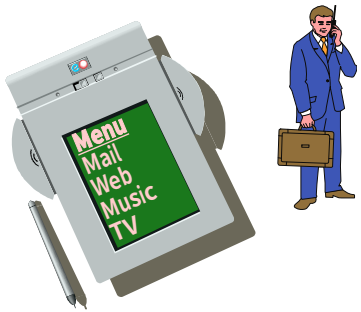
High speed data → **Small and light**

Wireless multi-media

Mobile computing
*by conventional devices and applications
*at comfortable speed Max. 1Mbps

All in One

PDA Type
(easier to operate)



Handset Type
(easier to carry)

Versatile features
*Voice communication
*Video phone
*Picture/Text mail
*Hi-Fi music(download/play)
*Television(public TV/pay TV)
*Location navigation
*Internet access
*Remote control of household articles

Wearable

Real Portable
*Easy to carry
*Hard to loose

2. Technical Considerations

Network Infrastructure for Advanced PHS

Core Network:

Equip with IP network connecting/routing function in response to increased demand for Internet access

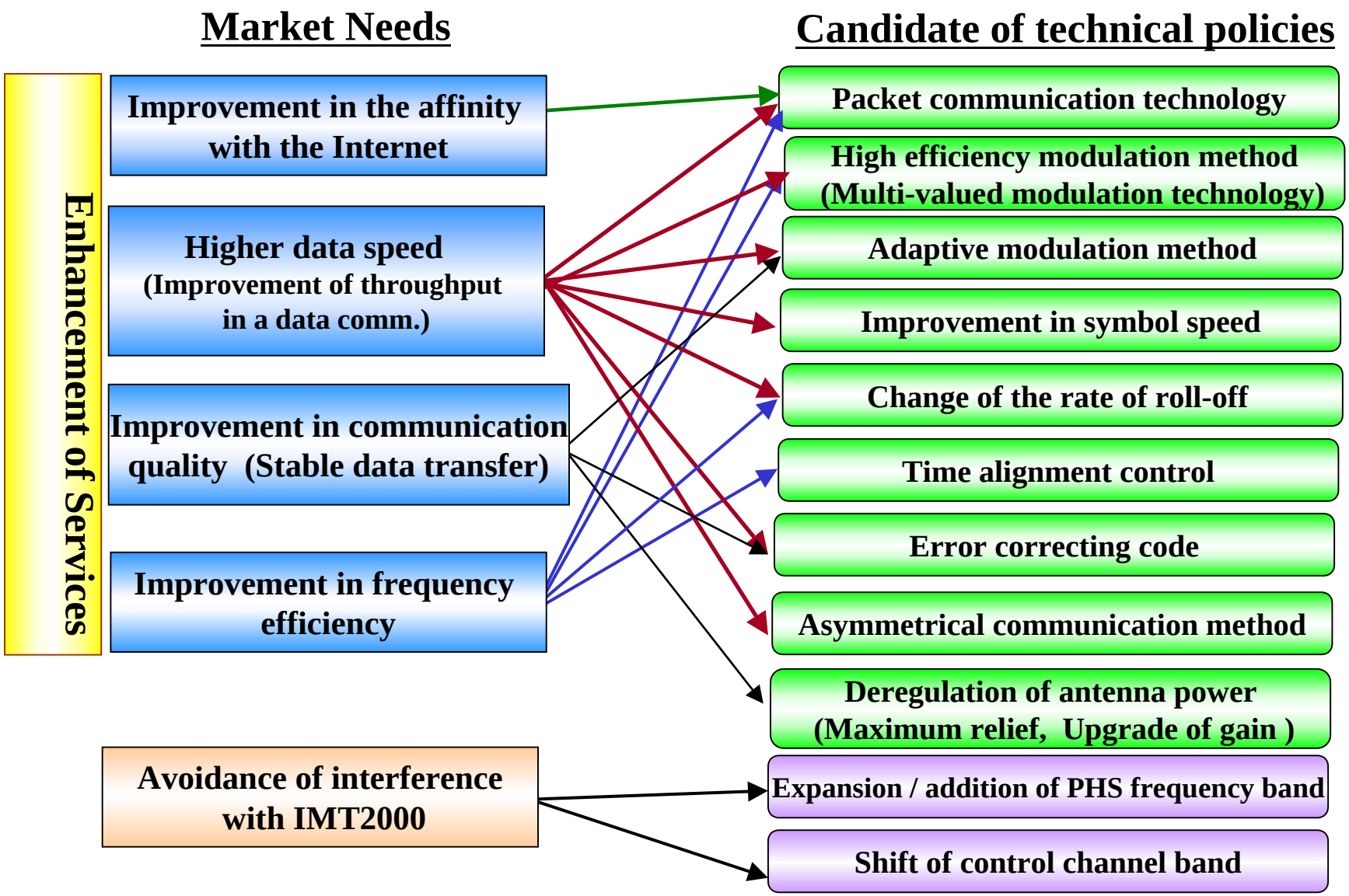
Service Network:

Shift toward an intelligent network that provides various and high quality services meeting with user's needs

Access Network:

Introduce new radio communication method, and modify MoU Specification (RCR STD-28 technical parameters)

Technical Study for PHS Radio Technology



New PHS Technical Parameters

New PHS technical parameters reported by the advanced PHS committee of Telecommunications Council (an advisory body of the Japanese Government) in June 2001.

Item	Advanced PHS	Existing PHS
Modulation system	BPSK, π/4 Shift QPSK, QPSK, 8PSK, 12QAM, 16QAM, 24QAM, 32QAM	π/4 Shift QPSK
Carrier spacing	300KHz, 900KHz	300KHz
Roll-off rate	0.38, 0.50	0.5
Slot configuration	Slot linking	not available
Packet communication	domant function	not available
Error correcting codes	available	not available
Path division multiple access	available	not available

Very High Speed Data Communication
by New PHS Technical Parameters

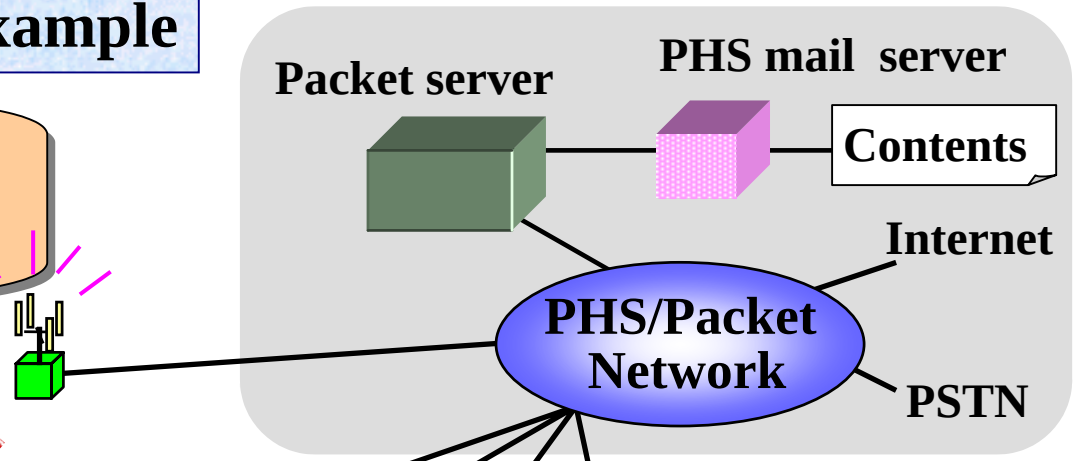
PHS MoU Group

A Typical Example

Advanced PHS

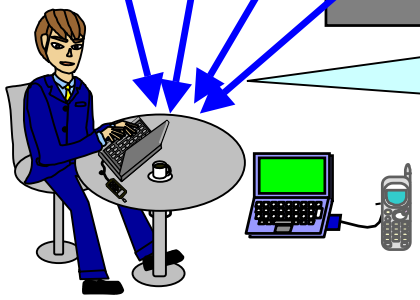
1Mbps = (64kbps x 2) x 3.3 x 2 x 1.2

- -Modulation system:16QAM
- -Carrier frequency spacing 900KHz and improved roll-off rate
- -To increase the number of slots per frame
- -Efficient slot configuration



1Mbps

128kbps

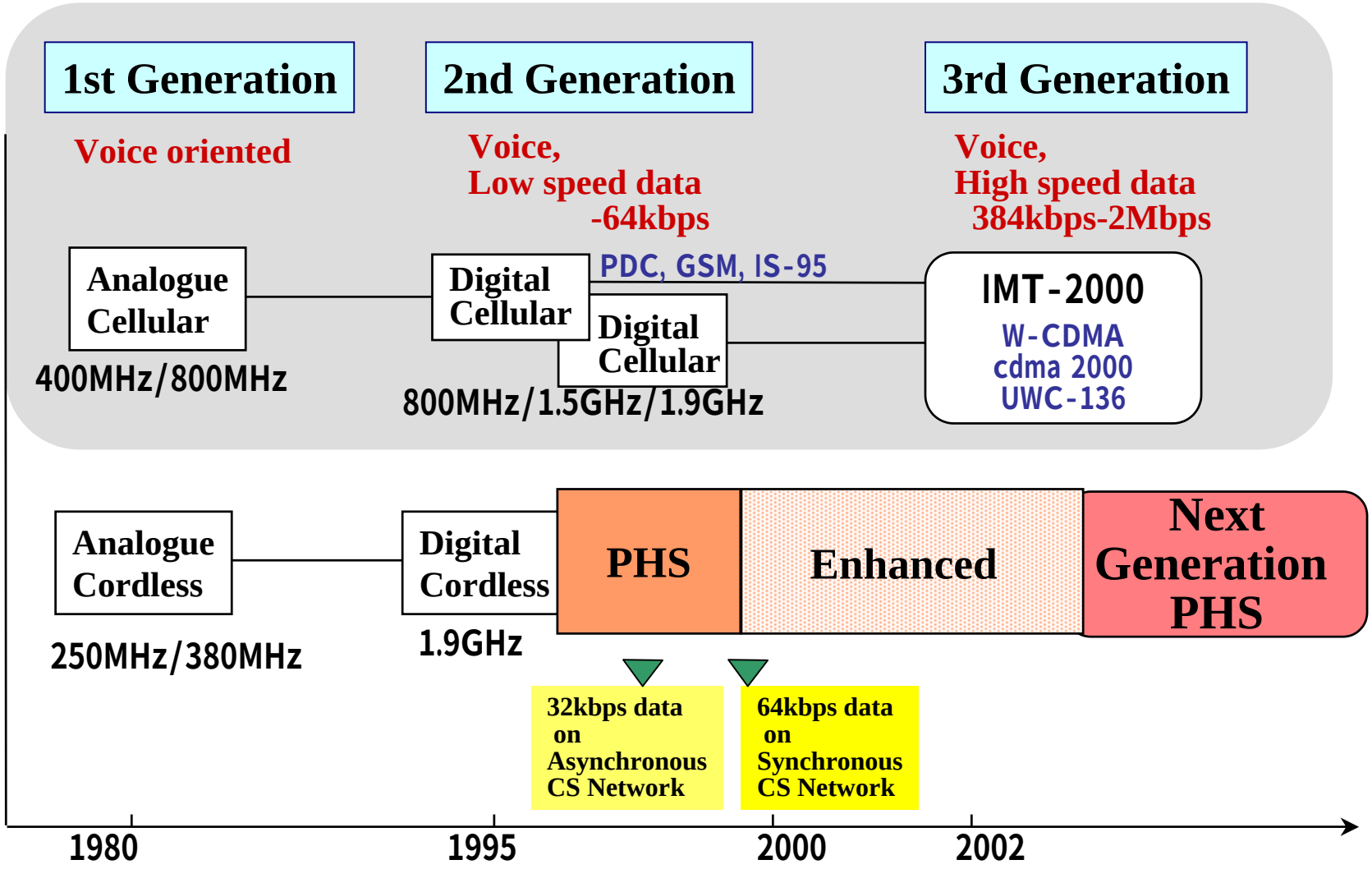


Expansion of Current PHS

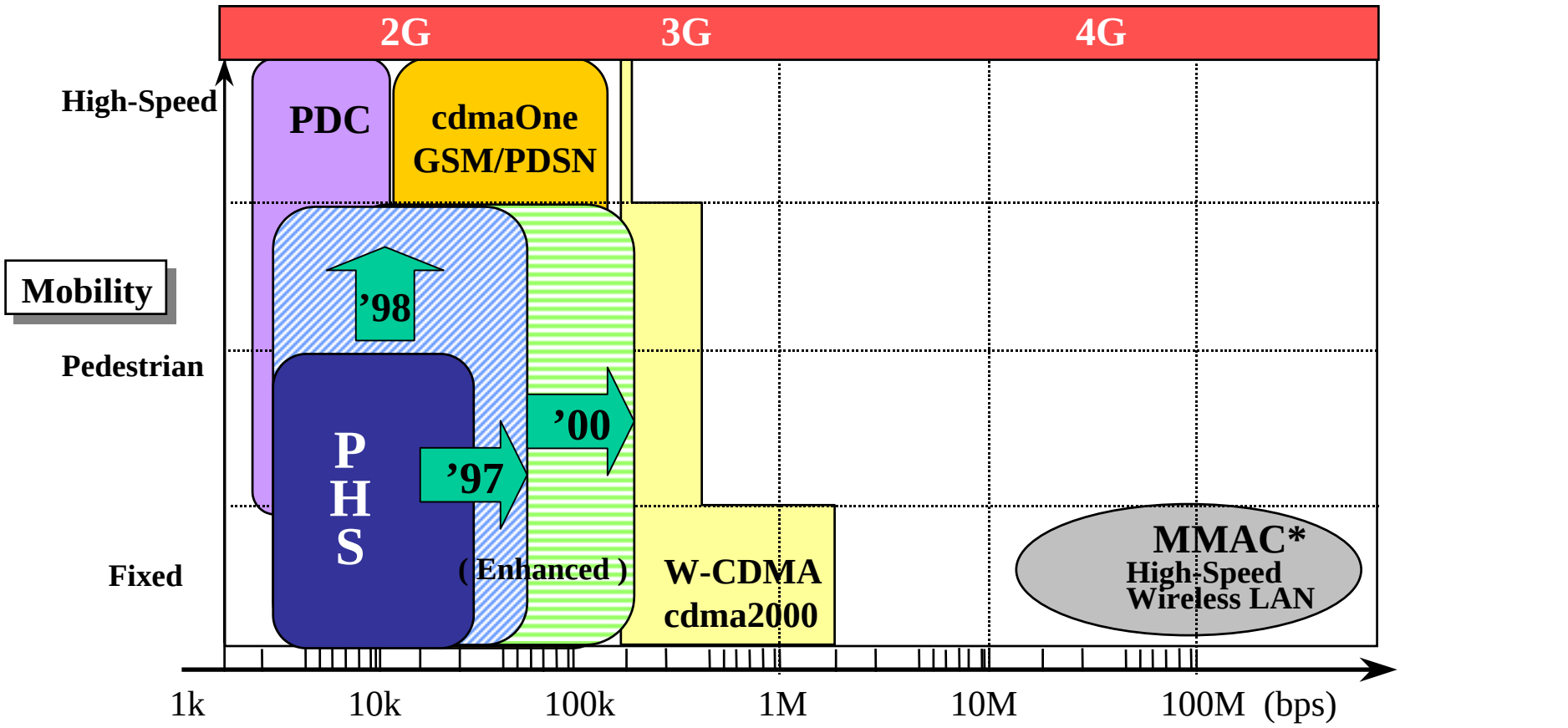
128kbps = 32kbps x 4ch

3. Migration Path

Transition of PHS Development

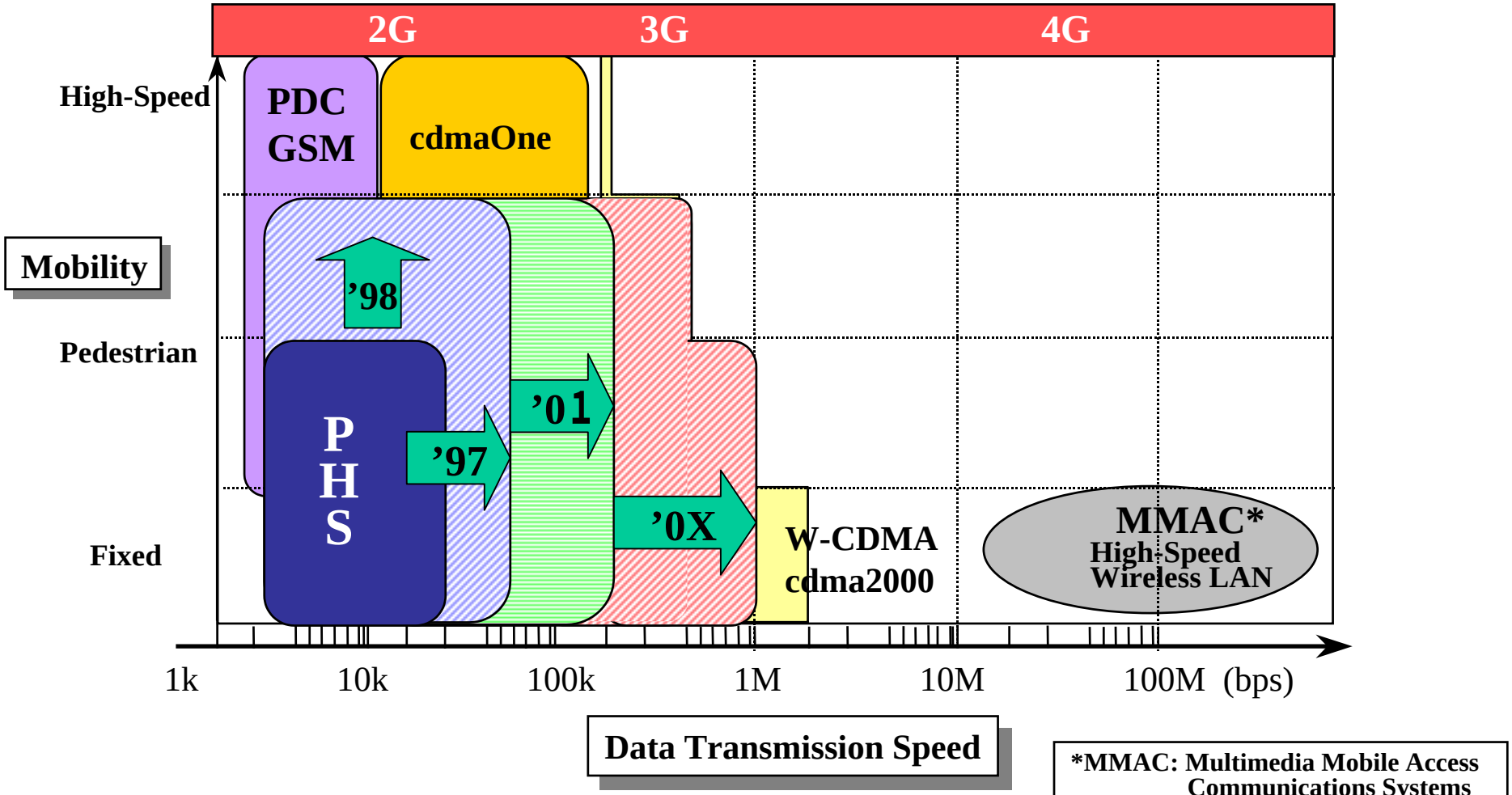


General Timetable of PHS Services



General Timetable of PHS Services

toward PHS Evolution 2000's



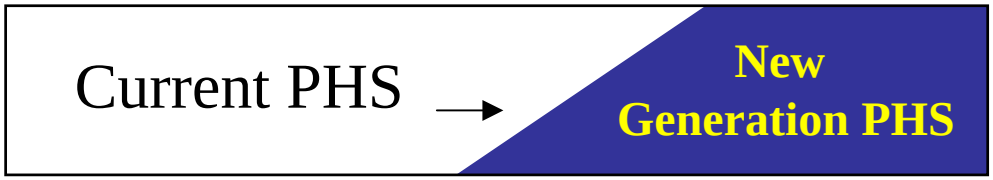
*MMAC: Multimedia Mobile Access Communications Systems

Service Migration Path to *PHS Evolution 2000's*

- In case of rapid increasing high-speed data traffic

PHS Network **Handset**

Co-exist and then overlaying



Current PHS handset,
New Generation PHS handset

- In case of slow increasing high-speed data traffic

Co-exist and Spot area covering

Current PHS handset,
New Generation PHS handset

4. Conclusion

Advanced PHS System Goal

The Middle Term (2001-2003)

- Realization of high-speed mobile multimedia communications up to 512kbps-1Mbps
- Strengthening of a high-speed hand-over

  Provision of high quality services in an IP era
- Borderless international roaming and services

The Long Term (2004-)

- Aim at ultra high-speed mobile multimedia communications by up to several Mbps